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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,036	08/29/2006	Koji Katano	128477	5830

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EXAMINER	
LEE, CYNTHIA K	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
02/23/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/591,036	KATANO, KOJI	
	Examiner	Art Unit	
	CYNTHIA LEE	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 November 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Amendment

This Office Action is responsive to the amendment filed on 11/17/2009. Claims 1-15 are pending. Applicant's arguments have been fully considered and are persuasive. However, upon further consideration, the instant claims are rejected under new grounds of rejections. Claims 1-15 are finally rejected for reasons necessitated by applicant's amendment.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 11-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi (US 2003/0157383).

Takahashi discloses a control apparatus for a fuel cell including an oxidizing gas supply device configured to supply an oxidizing gas to a cathode via an oxidizing gas supply line of the fuel cell, and a hydrogen supplying device configured to supply hydrogen to an anode via a hydrogen supply line of the fuel cell, the anode having a buildup of impurities over time causing a presence of residual gas. See Abstract.

The functional recitations of the claimed controller have been considered. However, it was not given patentable weight because it has been held by the courts that

a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (BdPatApp & Inter 1987). See MPEP 2115. It is noted that the functional recitations of the controller have been met by Takahashi because the control apparatus of Takahashi has the capabilities of functioning as claimed in claims 11-15, for the following reasons:

Regarding claims 11, 12, and 15, the cathode and anode pressures are capable of being measured [0032 and 0040], and thus the controller is capable of performing the calculations as claimed.

Regarding claims 13 and 14, the controller is capable of detecting a temperature of the fuel cell [0043], and thus the controller is capable of performing the calculations as claimed.

Thus, claims 11-15 are anticipated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-8, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (US 2003/0157383) in view of Yamanashi (US 6632552).

Takahashi discloses a control apparatus and a method for a fuel cell including an oxidizing gas supplying unit configured to supply an oxidizing gas to a cathode via an oxidizing gas supply line of the fuel cell, and a hydrogen supplying unit configured to supply hydrogen to an anode via a hydrogen supply line of the fuel cell, the anode having a buildup of impurities over time causing a presence of residual gas. See Abstract.

The control apparatus comprises a cathode-side gas pressure detecting unit configured to detect a gas pressure within the oxidizing gas supply line [0032];

On the basis of the current density and using the map, table, or mathematical expressions stored in memory, the controller 10 calculates the output voltage per fuel cell on the curved line W4 corresponding to the current density. If the output voltage per fuel cell determined from the voltage detected by the voltmeter 13 exceeds the output voltage per fuel cell on the curved line W4, it is determined that the impurity gas concentration has not reached the upper limit of allowable concentration (or target impurities partial pressure). If the output voltage per fuel cell determined from the voltage detected by the voltmeter 13 does not exceed the output voltage per fuel cell on the curved line W4, it is determined that the impurity gas concentration has reached the upper limit of allowable concentration [0050].

In order to restore the performance of the fuel cell, which deteriorates as operating time elapses, the controller 10 switches the three-way valve 4 from the normal running position to the purge running position according to necessity such that the anode effluent is released into the atmosphere. The release of anode effluent into

the atmosphere from the purge running position shall be referred to as purging. In order to avoid the release of hydrogen gas in the anode effluent into the atmosphere during purging, the controller 10 increases the power generating load on the fuel cell stack 1 as the anode effluent is purged such that all or substantially all of the hydrogen in the hydrogen-rich gas which is supplied to the anode 1A is expended in power generation [0044].

Next, an anode effluent purging control routine which is executed by the controller 10 in order to perform this control will be described with reference to FIG. 3. This routine commences when the fuel cell stack becomes capable of power generation, and is executed continuously until operation of the fuel cell stack 1 ceases [0046].

Takahashi discloses a target impurities partial pressure determining unit configured to dynamically calculate a target impurities partial pressure regarding a impurities pressure among a gas pressure mixture in within the anode, but does not calculate the hydrogen partial pressure. It would have been obvious to one of ordinary skill in the art at the time the invention was made to measure either the impurities partial pressure or the hydrogen partial pressure in the anode, since the anode gas stream only contains impurities and hydrogen, and either measurement indicates the amount of impurities in the anode gas mixture.

Takahashi discloses that the impurities partial pressure is based upon the predetermined upper limit of allowable concentration, but does not disclose that it is based on the gas pressure detected by the cathode-side gas pressure detecting

means. Yamanashi teaches that the compressor for the air, the reformer for the fuel, the air flow control valve, and the hydrogen control valve are controlled such that the pressures at the anode side and the cathode side of the fuel cell stack and the pressure difference between the anode side and the cathode side do not exceed the allowable limits to prevent an electrolytic membrane from being ruptured. This control is repeatedly carried out at successive sampling intervals (4:30-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to base the amount of hydrogen in the anode of Takahashi based on the air pressure for the benefit of not exceeding the amount of air required by the fuel cell.

A hydrogen supply control unit 11 is configured to supply hydrogen from the hydrogen supply means to the fuel cell at the hydrogen supply pressure [0045].

Regarding claims 2 and 7, the target hydrogen partial pressure necessarily increases as an electricity generation amount required of the fuel cell increases because increased electricity generation amount necessarily requires more reactant gas.

Regarding claim 3 and 8, a fuel cell temperature detecting unit is configured to detect a temperature of the fuel cell; and a correcting unit is configured to correct a target hydrogen partial pressure based upon the temperature of the fuel cell [0043]. The combination of Takahashi and Yamanashi calculates the hydrogen supply pressure of hydrogen to be supplied to the fuel cell based upon the corrected target hydrogen partial pressure and the gas pressure detected by the cathode-side gas pressure detecting unit.

Regarding claim 4, the controller of Takahashi has the capability where the target hydrogen partial pressure decreases as the temperature of the fuel cell increases.

Regarding claims 5 and 10, an exhaust unit 6 configured to discharge residual gas remaining within at least one of the anode;

an exhaust control unit 4 configured to discharge the residual gas using the exhaust unit when the hydrogen supply pressure is not within a tolerance range for gas pressure on the anode side [0062]; and

a residual gas partial pressure calculating unit configured to calculate a partial pressure of residual gas remaining within the anode when residual gas is discharged [0050], wherein

the hydrogen supply pressure calculating unit calculates the hydrogen supply pressure of hydrogen to be supplied to the fuel cell based upon the target hydrogen partial pressure and the residual gas partial pressure [0047, 0054].

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (US 2003/0157383) in view of Yamanashi (US 6632552) as applied to claim 6, further in view of Edlund (US 6667128).

Takahashi modified by Tamanashi teaches all the elements of claim 6 and are incorporated herein. Takahashi modified by Tamanashi does not teach that the target hydrogen partial pressure decreases as the temperature of the fuel cell increases. Edlund teaches that an advantage of operating at an elevated temperature is that the efficiency of the fuel cell increases in its operating temperature. As the temperature

increases, the electrocatalysts on the anode and cathode sides become more active. Also, the anode catalyst becomes less sensitive to gas-phase impurities (6:5-10). It would have been obvious to one of ordinary skill in the art at the time the invention was made to require less hydrogen in the anode stream of Takahashi modified by Yamanashi since more catalyst is available with increased temperature.

Response to Arguments

Applicant's arguments filed 11/17/2009 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Lee whose telephone number is 571-272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Lee/
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795